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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)

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Development of USTES Aptitude Test Battery

for

Parking Enforcement Officer

(gov. ser.) 375.588

U.S. DEPARTMENT OF LABOR
MANPOWER ADMINISTRATION

ED 068568

Technical Report on Development of USTES Aptitude Test Battery

For .....

Parking Enforcement Officer (gov. ser.) 375.588

S-437

(Developed in Cooperation with
the Illinois and Wisconsin State Employment Services)

Manpower Administration
U. S. Department of Labor

July 1969

FOREWORD

The United States Training and Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

GATB Study # 2741

Development of USTES Aptitude Test Battery

For

Parking Enforcement Officer (gov. ser.) 375.588-010
S-437

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Parking Enforcement Officer (gov. ser.) 375.588-010. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB Scores
G - General Learning Ability	75
V - Verbal Ability	80
Q - Clerical Perception	105

RESEARCH SUMMARY

Sample:

56(55 female and 1 male) workers employed as Parking-Enforcement Officers in Illinois and Wisconsin.

The sample contained three minority group members (2 Negroes and 1 American Indian). The remainder were non-minority group members.

Criterion:

Supervisory ratings

Design:

Concurrent (test and criterion data were collected at approximately the same time).

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analyses of aptitude mean scores, standard deviations, aptitude-criterion correlations and selective efficiencies.

Concurrent Validity:

Phi Coefficient = .50 ($P/2 < .0005$)

Effectiveness of Norms:

Only 79% of the nontest-selected workers used for this study were good workers; if the workers had been test-selected with the S-437 norms, 89% would have been good workers. 21% of the nontest-selected workers used for this study were poor workers; if the workers had been test-selected with the S-437 norms, only 11% would have been poor workers. The effectiveness of the norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Workers	79%	89%
Poor Workers	21%	11%

SAMPLE DESCRIPTION

Size:

N=56

Occupational Status:

Employed workers

Work Setting:

The workers were employed at the following locations:

Appleton, Wisconsin
Antigo, Wisconsin
Beloit, Wisconsin
Freeport, Illinois
Green Bay, Wisconsin
Janesville, Wisconsin
Kenosha, Wisconsin
La Crosse, Wisconsin
Madison, Wisconsin
Marinette, Wisconsin
Oshkosh, Wisconsin
Racine, Wisconsin
Rockford, Illinois
Superior, Wisconsin
Waukesha, Wisconsin
West Allis, Wisconsin
Wisconsin Rapids, Wisconsin

Employer Selection Requirements:

Education: Varies from none to high school graduate.

Previous Experience: None required

Tests: None

Other: Personal Interview and physical examination

Principal Activities: The job duties for each worker are comparable to those shown in the job description in the Fact Sheet.

Minimum Experience: All workers had at least four months total job experience.

TABLE 2

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education and Experience.

	Mean	SD	Ranges	r
Age (years)	38.6	7.8	19-53	-.050
Education (years)	11.8	1.1	6-15	.239
Experience (months)	36.3	30.4	4-144	.058

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B were administered during 1967 and 1968.

CRITERION

The criterion data consisted of supervisory ratings of job proficiency made at approximately the same time the tests were administered with a time interval of from two to eight weeks between the two ratings.

Rating Scale: An adaptation of USES Form SP-21 "Descriptive Rating Scale" was used. The scale (see Appendix) consisted of eight items with five alternatives. The alternatives indicate the different degrees of proficiency.

Reliability: A reliability coefficient of .65 was obtained between the two ratings. Therefore, the final criterion consists of the combined scores of the two ratings.

Criterion Score Distribution:		
	Possible Range:	16-80
	Actual Range:	42-72
	Mean:	57.6
	Standard Deviation:	7.3

Criterion Dichotomy: The criterion distribution was dichotomized into low and high groups by placing 21% of the sample in the low group to correspond with the percentage of workers considered unsatisfactory or marginal by the supervisors. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers". The criterion critical score is 54.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Aptitudes G and V which do not have a high correlation with the criterion, were considered for inclusion in the norms because the qualitative analysis indicated that the aptitudes were important for the job duties and the sample had a relatively low standard deviation on these aptitudes. The sample also had relatively high mean scores for aptitude V. With employed workers a relatively low standard deviation or a relatively high mean score may indicate that some sample pre-selection has taken place. Tables 3,4, and 5 show the results of the qualitative and statistical analyses.

TABLE 3

Qualitative Analysis

(Based on the job analysis, the aptitudes indicated appear to be important to the work performed)

Aptitudes	Rationale
G - General Learning Ability	Required in learning procedure of writing parking tickets, in recognizing the law violations and in being able to give directions.
V - Verbal Ability	Required to answer inquiries and give directions to the public.
Q - Clerical Perception	Required in accurately writing out parking tickets after observing parking meters for overtime parking violations

TABLE 4

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N=56.

	Mean	SD	Range	r
G - General Learning Ability	98.4	13.6	67-125	.221
V - Verbal Ability	101.8	14.3	76-141	.054
N - Numerical Aptitude	98.2	13.6	63-129	.457**
S - Spatial Aptitude	97.4	16.1	68-143	.080
P - Form Perception	104.0	16.5	61-146	.213
Q - Clerical Perception	116.9	12.6	88-146	.314*
K - Motor Coordination	101.4	14.4	62-136	-.034
F - Finger Dexterity	98.9	16.0	56-140	.026
M - Manual Dexterity	97.4	15.8	56-127	.115

**Significant at the .01 level
*Significant at the .05 level

TABLE 5
Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data Important Irrelevant	X	X				X			
Relatively High Mean		X			X	X	X		
Relatively Low Standard Dev.	X	X	X			X			
Significant Correlation with Criterion			X			X			
Aptitudes to be Considered for Trial Norms	G	V	N			Q			

DERIVATION AND VALDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of Aptitudes G, V, N, and Q, at trial cutting scores, were able to differentiate between the 79% of the sample considered good workers and the 21% of the sample considered poor workers. Trial cutting scores at five-point intervals approximately one standard deviation below the mean are tried because this will eliminate about 1/3 of the sample with three-aptitude norms. For two-aptitude trial norms, minimum cutting scores of slightly more than one standard deviation below the mean will eliminate about 1/3 of the sample; for four-aptitude trial norms, cutting scores of slightly less than one standard deviation below the mean will eliminate about 1/3 of the sample. The Phi Coefficient was used as the basis for comparing trial norms. The optimum differentiation for the occupation of Parking Enforcement Officer (gov. ser.) 375.588-010 was provided by norms of G-75, V-80, and Q-105. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .50 (statistically significant at the .0005 level).

TABLE 6

Concurrent Validity of Trial Norms
G-75, V-80, Q-105

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	3	41	44
Poor Workers	7	5	12
Total	10	46	56

Phi Coefficient (ϕ) = .50 Chi Square (X^2_y) = 13.7
Significance Level = $P/2 < .0005$

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study did not meet the requirements for incoporating the occupation studied into any of the 36 OAP's included in Section II of the Manual for the General Aptitude Test Battery. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.

SP-21
Rev. 2/61

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATING SCALE FOR _____
D. O. T. Title and Code

Directions: Please read Form SP-20, "Suggestions to Raters", and then fill in the items listed below. In making your ratings, only <u>one</u> box should be checked for each question.

Name of Worker (print) _____
(Last) (First)

Sex: Male_____ Female_____

Company Job Title: _____

How often do you see this worker in a work situation?

☐ See him at work all the time.

☐ See him at work several times a day.

☐ See him at work several times a week.

☐ Seldom see him in work situation.

How long have you worked with him?

☐ Under one month.

☐ One to two months.

☐ Three to five months.

☐ Six months or more.

A. How much work can he get done? (Worker's ability to make efficient use of his time and to work at high speed.)

☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.

☐ 2. Capable of low work output. Can perform at a slow pace.

☐ 3. Capable of fair work output. Can perform at an acceptable but not a fast pace.

☐ 4. Capable of high work output. Can perform at a fast pace.

☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of his work? (Worker's ability to do high-grade work which meets quality standards.)

☐ 1. Performance is inferior and almost never meets minimum quality standards.

☐ 2. The grade of his work could stand improvement. Performance is usually acceptable but somewhat inferior in quality.

☐ 3. Performance is acceptable but usually not superior in quality.

☐ 4. Performance is usually superior in quality.

☐ 5. Performance is almost always of the highest quality.

C. How accurate is he in his work? (Worker's ability to avoid making mistakes.)

☐ 1. Makes very many mistakes. Work needs constant checking.

☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.

☐ 3. Makes mistakes occasionally. Work needs only normal checking.

☐ 4. Makes few mistakes. Work seldom needs checking.

☐ 5. Rarely makes a mistake. Work almost never needs checking.

D. How much does he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

☐ 1. Has very limited knowledge. Does not know enough to do his job adequately.

☐ 2. Has little knowledge. Knows enough to "get by."

☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.

☐ 4. Has broad knowledge. Knows enough to do good work.

☐ 5. Has complete knowledge. Knows his job thoroughly.

E. How much aptitude or facility does he have for this kind of work? (Worker's adeptness or knack for performing his job easily and well.)

☐ 1. Has great difficulty doing his job. Not at all suited to this kind of work.

☐ 2. Usually has some difficulty doing his job. Not too well suited to this kind of work.

☐ 3. Does his job without too much difficulty. Fairly well suited to this kind of work.

☐ 4. Usually does his job without difficulty. Well suited to this kind of work.

☐ 5. Does his job with great ease. Exceptionally well suited for this kind of work.

G. How resourceful is he when something different comes up or something out of the ordinary occurs? (Worker's ability to apply what he already knows to a new situation.)

☐ 1. Almost never is able to figure out what to do. Needs help on even minor problems.

☐ 2. Often has difficulty handling new situations. Needs help on all but simple problems.

☐ 3. Sometimes knows what to do, sometimes doesn't. Can deal with problems that are not too complex.

☐ 4. Usually able to handle new situations. Needs help on only complex problems.

☐ 5. Practically always figures out what to do himself. Rarely needs help, even on complex problems.

H. How many practical suggestions does he make for doing things in better ways? (Worker's ability to improve work methods.)

☐ 1. Sticks strictly with the routine. Contributes nothing in the way of practical suggestions.

☐ 2. Slow to see new ways to improve methods. Contributes few practical suggestions.

☐ 3. Neither quick nor slow to see new ways to improve methods. Contributes some practical suggestions.

☐ 4. Quick to see new ways to improve methods. Contributes more than his share of practical suggestions.

☐ 5. Extremely alert to see new ways to improve methods. Contributes an unusually large number of practical suggestions.

I. Considering all the factors already rated, and only these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

☐ 1. Would be better off without him. Performance usually not acceptable.

☐ 2. Of limited value to the organization. Performance somewhat inferior.

☐ 3. A fairly proficient worker. Performance generally acceptable.

☐ 4. A valuable worker. Performance usually superior.

☐ 5. An unusually competent worker. Performance almost always top notch.

July 1969

FACT SHEET

Job Title: Parking Enforcement Officer (gov. ser.) 375.588-010

Job Summary:

Patrols assigned area, such as public parking lots or section of city, to issue tickets for overtime parking at parking meters.

Work Performed:

Patrols assigned area on foot. Observes parking meter for overtime parking violations. Writes tickets, recording time, date and place of citation. Reports other types of parking or other law violations to regular police officers. Answers inquiries and gives directions to the public.

Effectiveness of Norms:

79% of the nontest-selected workers used for this study were good workers, if the workers had been test-selected with the S-437 norms, 89% would have been good workers. 21% of the nontest-selected workers used for this study were poor workers, if the workers had been test-selected with S-437 norms, only 11% would have been poor workers.

Applicability of S-437 Norms:

The aptitude test battery is applicable to jobs which include a majority of the duties described above.

GPO 883-173

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